IN THE CLAIMS

1. (Previously Presented) A method of production of an ultra-thin semiconductor device comprising the steps of:

forming a first single crystalline semiconductor layer on a seed substrate via a first porous semiconductor peeling layer;

bonding said seed substrate from said first single crystalline semiconductor layer side in the state with an insulating layer interposed to a support substrate having a second single crystalline semiconductor layer formed thereon via a second porous semiconductor peeling layer wherein the first porous semiconductor peeling layer has a greater porosity than the second porous semiconductor peeling layer;

separating said seed substrate using said first porous semiconductor peeling layer as an interface; and

separating said support substrate using said second porous semiconductor peeling layer as an interface to obtain said first single crystalline semiconductor layer formed on said insulating layer.

2. (Withdrawn) A method of production of an ultra-thin semiconductor device comprising the steps of:

forming a base comprised of a support substrate on which a second porous semiconductor peeling layer, a second single crystalline semiconductor layer, an insulating layer, and a first single crystalline semiconductor layer are stacked and forming a semiconductor device unit and projecting connection electrodes to be connected to the semiconductor device unit at said first single crystalline semiconductor layer;

forming a score along a separation line for separation to an individual semiconductor device from said first single crystalline semiconductor layer side until at least said second porous semiconductor peeling layer of said base is reached;

forming a resin protective film filling an interior of said score and covering the surface of said first single crystalline semiconductor layer;

exposing said projecting connection electrodes at the surface by polishing one surface of the resin protective film;

covering the resin protective film surface and said projecting connection electrode surfaces by a conductive protective tape free from residual;

peeling off said support substrate using said second porous semiconductor peeling layer as an interface; and

dicing from said second crystalline semiconductor layer side along said resin protective film filled in said score to separate an individual semiconductor device.

3. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 2, further comprising, in the step of peeling off said support substrate at said second porous semiconductor peeling layer as an interface, spraying a fluid from a lateral direction to said second porous semiconductor peeling layer while rotating to peel off said support substrate.

4. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 2, further comprising, in the step of peeling off said support substrate at said second porous semiconductor peeling layer as an interface, emitting a laser beam from a lateral direction to said second porous semiconductor peeling layer while rotating to peel off said support substrate.

5. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 2, wherein said step of forming a base comprises the steps of:

forming a first porous semiconductor peeling layer at a seed substrate;

forming said first single crystalline semiconductor layer on said first porous semiconductor peeling layer;

forming said second porous semiconductor peeling layer on said support substrate;

forming said second single crystalline semiconductor layer on said second porous semiconductor peeling layer;

forming said insulating layer on at least one of said first single crystalline semiconductor layer and said second single crystalline semiconductor layer;

bonding said seed substrate and said support substrate from said first single crystalline semiconductor layer and said second single crystalline semiconductor layer sides in the state with said insulating layer interposed;

peeling off said seed substrate at said first porous semiconductor peeling layer as an interface; and

etching the surface of said first single crystalline semiconductor layer by hydrogen annealing.

6. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 5, further comprising, in the step of peeling off said seed substrate at said first porous semiconductor peeling layer as an interface, spraying a fluid from a lateral direction to said first porous semiconductor peeling layer while rotating to peel off said seed substrate.

7. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 5, further comprising, in the step of peeling off said seed substrate at said first porous semiconductor peeling layer as an interface, emitting a laser beam from a lateral direction to said first porous semiconductor peeling layer while rotating to peel off said seed substrate.

8. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 5, further comprising, in the step of forming said insulating layer, forming said insulating layer including at least one type of film among a silicon oxide film, a silicon nitride film, a multilayer film of a silicon oxide film and silicon nitride film, a multilayer film of a silicon oxide film, a silicon nitride film, and a silicon oxide film, a silicon oxynitride film, and an aluminum oxide film.

9. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 5, further comprising, in the steps of forming said first porous semiconductor peeling layer and said second porous semiconductor peeling layer, forming said layer by forming an impurity doped layer comprised of a single crystalline semiconductor layer including an impurity and converting it to a porous semiconductor by anodic conversion.

10. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 5, further comprising, in the steps of forming said first porous semiconductor peeling layer and said second porous semiconductor peeling layer, forming said layers by making a porosity and thickness of said first porous semiconductor peeling layer larger than those of said second porous semiconductor peeling layer so as to enable peeling off at said first porous semiconductor peeling layer as an interface compared with said second porous semiconductor peeling layer when peeling off said seed substrate.

11. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 5, further comprising, in the steps of forming said first porous semiconductor peeling layer and said second porous semiconductor peeling layer, forming the layer by at least two layers of different porosities.

12. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 2, further comprising, in the step of separation to an individual semiconductor device, dicing by a width narrower than a width of said score and at the substantial center of said score so that part of said resin protective film covers the side surfaces of said first single crystalline semiconductor layer, said insulating layer, and said second single crystalline semiconductor layer separated by the dicing.

13. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device comprising the steps of:

forming a base comprised of a support substrate on which a second porous semiconductor peeling layer, a second single crystalline semiconductor layer, an insulating layer, and a first single crystalline semiconductor layer are stacked and forming a solid-state image pickup sensor unit and projecting connection electrodes to be connected to the solid-state image pickup sensor unit at said first single crystalline semiconductor layer;

forming a score along a separation line for separation to an individual solid-state image pickup device from said first single crystalline semiconductor layer side until at least said second porous semiconductor peeling layer of said base is reached;

forming a resin protective film filling an interior of said score and covering the surface of said first single crystalline semiconductor layer;

exposing said projecting connection electrodes at the surface by polishing one surface of the resin protective film;

covering the resin protective film surface and said projecting connection electrode surfaces by a conductive protective tape free from residual;

peeling off said support substrate using said second porous semiconductor peeling layer as an interface; and

dicing from said second crystalline semiconductor layer side along said resin protective film filled in said score to separate an individual solid-state image pickup device.

14. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 13, further comprising, in the step of peeling off said support substrate at said second porous semiconductor peeling layer as an interface, spraying a fluid from a lateral direction to said second porous semiconductor peeling layer while rotating to peel off said support substrate.

15. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 13, further comprising, in the step of peeling off said support substrate at said second porous semiconductor peeling layer as an interface, emitting a laser beam from a lateral direction to said second porous semiconductor peeling layer while rotating to peel off said support substrate.

16. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 13, wherein said step of forming a base comprises the steps of:

forming a first porous semiconductor peeling layer at a seed substrate;

forming said first single crystalline semiconductor layer on said first porous semiconductor peeling layer;

forming said second porous semiconductor peeling layer on said support substrate;

forming said second single crystalline semiconductor layer on said second porous semiconductor peeling layer;

forming said insulating layer on at least one of said first single crystalline semiconductor layer and said second single crystalline semiconductor layer;

bonding said seed substrate and said support substrate from said first single crystalline semiconductor layer and said second single crystalline semiconductor layer sides in the state with said insulating layer interposed;

peeling off said seed substrate at said first porous semiconductor peeling layer as an interface; and

etching the surface of said first single crystalline semiconductor layer by hydrogen annealing.

17. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 16, further comprising, in the step of peeling off said seed substrate at said first porous semiconductor peeling layer as an interface, spraying a fluid from a lateral direction to said first porous semiconductor peeling layer while rotating to peel off said seed substrate.

18. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 16, further comprising, in the step of peeling off said seed substrate at said first porous

semiconductor peeling layer as an interface, emitting a laser beam from a lateral direction to said first porous semiconductor peeling layer while rotating to peel off said seed substrate.

19. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 16, further comprising, in the step of forming said insulating layer, forming said insulating layer including at least one type of film among a silicon oxide film, a silicon nitride film, a multilayer film of a silicon oxide film and silicon nitride film, a multilayer film of a silicon oxide film, a silicon nitride film, and a silicon oxide film, a silicon oxynitride film, and an aluminum oxide film.

20. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 16, further comprising, in the steps of forming said first porous semiconductor peeling layer and said second porous semiconductor peeling layer, forming said layer by forming an impurity doped layer comprised of a single crystalline semiconductor layer including an impurity and converting it to a porous semiconductor by anodic conversion.

21. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 16, further comprising, in the steps of forming said first porous semiconductor peeling layer and said second porous semiconductor peeling layer, forming said layers by making a porosity and thickness of said first porous semiconductor peeling layer larger than those of said second porous semiconductor peeling layer so as to enable peeling off at said first porous semiconductor peeling layer as an interface compared with said second porous semiconductor peeling layer when peeling off said seed substrate.

22. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 16, further comprising, in the steps of forming said first porous semiconductor peeling layer and said second porous semiconductor peeling layer, forming the layer by at least two layers of different porosities.

23. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 13, further comprising, in the step of separation to an individual solid-state image pickup device, dicing by a width narrower than a width of said score and at the substantial center of said score so that part of said resin protective film covers the side surfaces of said first single crystalline semiconductor layer, said insulating layer, and said second single crystalline semiconductor layer separated by the dicing.

24. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 13, further comprising, after the step of separation to an individual solid-state image pickup device, the steps of:

removing said second single crystalline semiconductor layer to form said resin protective layer projecting up from the surface of said insulating layer by exactly an amount corresponding to the thickness of said second single crystalline semiconductor layer and covering the side surfaces of said solid-state image pickup device and

affixing a transparent substrate to said solid-state image pickup device from said insulating layer side using the amount of projection of said resin protective layer as an air gap.

25. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 13,

further comprising, after the step of peeling off said support substrate at said second porous semiconductor peeling layer as an interface and before the step of separation to an individual solid-state image pickup device, a step of affixing a color filter substrate from said insulating film side of said solid-state image pickup device and

further comprising, in said step of separation to an individual solid-state image pickup device, dicing from said color filter substrate side along said resin protective film filling said score to separate said individual solid-state image pickup device.

26. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 25,

further comprising, in said step of forming a resin protective film, forming a transparent resin protective film and

further comprising, in said step of affixing said color filter substrate, positioning by monitoring an alignment mark of said first single crystalline semiconductor layer through said resin protective film and an alignment mark of said color filter substrate, then affixing said color filter substrate.

27. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 13,

further comprising, after said step of peeling off said support substrate at said second porous semiconductor peeling layer as an interface and before said step of separation to an individual solid-state image pickup device, the steps of removing said second single crystalline semiconductor layer to expose said

insulating layer, forming an on-chip color filter including a pigment on said exposed insulating layer, and forming an on-chip microlens on said on-chip color filter and

further comprising, before or after said step of separation into an individual solid-state image pickup device, the step of affixing a transparent substrate on said solid-state image pickup sensor unit from said on-chip microlens side with a predetermined air gap determined by a diameter of a spacer in a sealing agent.

28. (Withdrawn) A method of production of an ultra-thin semiconductor device comprising the steps of:

forming a first single crystalline semiconductor layer on a seed substrate via an ion implanted first ion implanted peeling layer;

bonding said seed substrate from said first single crystalline semiconductor layer side to a support substrate via an insulating layer;

separating said seed substrate using said first ion implanted peeling layer as an interface; and

separating said support substrate using an ion implanted second ion implanted peeling layer as an interface to obtain said first single crystalline semiconductor layer formed on said insulating layer.

29. (Withdrawn) A method of production of an ultra-thin semiconductor device comprising the steps of:

forming a base comprised of a support substrate on which an ion implanted second ion implanted peeling layer, a second single crystalline semiconductor layer, an insulating layer, and a first single crystalline semiconductor layer are stacked and forming a semiconductor device unit and projecting connection electrodes to be connected to the semiconductor device unit at said first single crystalline semiconductor layer;

forming a score along a separation line for separation to an individual semiconductor device from said first single crystalline semiconductor layer side until at least said second ion implanted peeling layer of said base is reached;

forming a resin protective film filling an interior of said score and covering the surface of said first single crystalline semiconductor layer;

exposing said projecting connection electrodes at the surface by a polishing one surface of the resin protective film;

covering said resin protective film surface and said projecting connection electrode surfaces by a conductive protective tape free from residual;

peeling off said support substrate using said second ion implanted peeling layer as an interface; and

dicing from said second single crystalline semiconductor layer side along said resin protective film filled in said score to separate an individual semiconductor device.

30. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 29, further comprising, in said step of peeling off said support substrate at said second ion implanted peeling layer as an interface, emitting a laser beam from a lateral direction to said second ion implanted peeling layer while rotating to peel off said support substrate.

31. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 29, wherein said step of forming a base comprised of said support substrate on which a second ion implanted peeling layer, a second single crystalline semiconductor layer, an insulating layer, and a first single crystalline semiconductor layer are stacked and forming a semiconductor device unit and

projecting connection electrodes to be connected to the semiconductor device unit at said first single crystalline semiconductor layer comprises the steps of:

implanting ions into a seed substrate to form a first ion implanted peeling layer at a depth from the surface of said seed substrate corresponding to a thickness of said first single crystalline semiconductor layer;

forming an insulating layer at said support substrate;

bonding said seed substrate and said support substrate from said first single crystalline semiconductor layer and said insulating layer sides;

peeling off said seed substrate at said first ion implanted peeling layer as an interface to form a first single crystalline semiconductor layer;

etching the surface of said first single crystalline semiconductor layer by hydrogen annealing;

forming said semiconductor device unit at said first single crystalline semiconductor layer;

implanting ions so as to pass through said insulating layer from said first single crystalline semiconductor layer side to form a second ion implanted peeling layer at a depth from said bonding interface of said support substrate with said insulating film corresponding to the thickness of said second single crystalline semiconductor layer; and

forming said projecting connection electrodes to be connected to said semiconductor device unit at said first single crystalline semiconductor layer.

32. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 31, further comprising, in said step of peeling off said seed substrate at said first ion implanted peeling layer as an interface to form said first single crystalline semiconductor layer, emitting a laser beam from a lateral

direction to said first ion implanted peeling layer while rotating to peel off said seed substrate.

33. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 31, further comprising, in the step of forming said insulating layer, forming said insulating layer including at least one type of film among a silicon oxide film, a silicon nitride film, a multilayer film of a silicon oxide film and silicon nitride film, a multilayer film of a silicon oxide film, a silicon nitride film, and a silicon oxide film, a silicon oxynitride film, and an aluminum oxide film.

34. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 31, further comprising, in said step of peeling off said seed substrate at said first ion implanted peeling layer as an interface, performing heat treatment to cause strain in said first ion implanted peeling layer, then pulling in a direction separating said seed substrate and said support substrate to peel off said seed substrate.

35. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 31, further comprising, after said step of forming said second ion implanted peeling layer, a step of performing heat treatment to cause strain in said second ion implanted peeling layer.

36. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 29, further comprising, in the step of separation to an individual semiconductor device, dicing by a width narrower than a width of said score and at the substantial center of said score so that part of said resin protective film covers the side surfaces of said first single crystalline semiconductor layer, said insulating layer, and said second single crystalline semiconductor layer separated by the dicing.

37. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device comprising the steps of:

forming a base comprised of a support substrate on which an ion implanted second ion implanted peeling layer, a second single crystalline semiconductor layer, an insulating layer, and a first single crystalline semiconductor layer are stacked and forming a solid-state image pickup sensor unit and projecting connection electrodes to be connected to the solid-state image pickup sensor unit at said first single crystalline semiconductor layer;

forming a score along a separation line for separation to an individual solid-state image pickup device from said first single crystalline semiconductor layer side until at least said second ion implanted peeling layer of said base is reached;

forming a resin protective film filling an interior of said score and covering the surface of said first single crystalline semiconductor layer;

exposing said projecting connection electrodes at the surface by a polishing one surface of the resin protective film;

covering said resin protective film surface and said projecting connection electrode surfaces by a conductive protective tape free from residual;

peeling off said support substrate using said second ion implanted peeling layer as an interface; and

dicing from said second single crystalline semiconductor layer side along said resin protective film filled in said score to separate an individual solid-state image pickup device.

38. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 37, further comprising, in said step of peeling off said support substrate at said second ion

implanted peeling layer as an interface, emitting a laser beam from a lateral direction to said second ion implanted peeling layer while rotating to peel off said support substrate.

39. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 37, wherein said step of forming a base comprised of said support substrate on which a second ion implanted peeling layer, a second single crystalline semiconductor layer, an insulating layer, and a first single crystalline semiconductor layer are stacked and forming a solid-state image pickup sensor unit and projecting connection electrodes to be connected to the solid-state image pickup sensor unit at said first single crystalline semiconductor layer comprises the steps of:

implanting ions into a seed substrate to form a first ion implanted peeling layer at a depth from the surface of said seed substrate corresponding to a thickness of said first single crystalline semiconductor layer;

forming an insulating layer at said support substrate;

bonding said seed substrate and said support substrate from said first single crystalline semiconductor layer and said insulating layer sides;

peeling off said seed substrate at said first ion implanted peeling layer as an interface to form a first single crystalline semiconductor layer;

etching the surface of said first single crystalline semiconductor layer by hydrogen annealing;

forming said solid-state image pickup sensor unit at said first single crystalline semiconductor layer;

implanting ions so as to pass through said insulating layer from said first single crystalline semiconductor layer side to form a second ion implanted

peeling layer at a depth from said bonding interface of said support substrate with said insulating film corresponding to the thickness of said second single crystalline semiconductor layer; and

forming said projecting connection electrodes to be connected to said solid-state image pickup sensor unit at said first single crystalline semiconductor layer.

40. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 39, further comprising, in said step of peeling off said seed substrate at said first ion implanted peeling layer as an interface to form said first single crystalline semiconductor layer, emitting a laser beam from a lateral direction to said first ion implanted peeling layer while rotating to peel off said seed substrate.

41. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 39, further comprising, in the step of forming said insulating layer, forming said insulating layer including at least one type of film among a silicon oxide film, a silicon nitride film, a multilayer film of a silicon oxide film and silicon nitride film, a multilayer film of a silicon oxide film, a silicon nitride film, and a silicon oxide film, a silicon oxynitride film, and an aluminum oxide film.

42. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 39, further comprising, in said step of peeling off said seed substrate at said first ion implanted peeling layer as an interface, performing heat treatment to cause strain in said first ion implanted peeling layer, then pulling in a direction separating said seed substrate and said support substrate to peel off said seed substrate.

43. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 39, further comprising, after said step of forming said second ion implanted peeling layer, a step of performing heat treatment to cause strain in said second ion implanted peeling layer.

44. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 37, further comprising, in the step of separation to an individual solid-state image pickup device, dicing by a width narrower than a width of said score and at the substantial center of said score so that part of said resin protective film covers the side surfaces of said first single crystalline semiconductor layer, said insulating layer, and said second single crystalline semiconductor layer separated by the dicing.

45. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 37, further comprising, after said step of separation to an individual solid-state image pickup device, the steps of:

removing said second single crystalline semiconductor layer to form said resin protective layer projecting up from the surface of said insulating layer by exactly an amount corresponding to the thickness of said second single crystalline semiconductor layer and covering the side surfaces of said solid-state image pickup device and

affixing a transparent substrate to said solid-state image pickup device from said insulating layer side using the amount of projection of said resin protective layer as an air gap.

46. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 37,

further comprising, after the step of peeling off said support substrate at said second ion implanted peeling layer as an interface and before the step of separation to an individual solid-state image pickup device, a step of affixing a color filter substrate from said insulating film side of said solid-state image pickup device and

further comprising, in said step of separation to an individual solid-state image pickup device, dicing from said color filter substrate side along said resin protective film filling said score to separate said individual solid-state image pickup device.

47. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 46,

further comprising, in said step of forming a resin protective film, forming a transparent resin protective film and

further comprising, in said step of affixing said color filter substrate, positioning by monitoring an alignment mark of said first single crystalline semiconductor layer through said resin protective film and an alignment mark of said color filter substrate, then affixing said color filter substrate.

48. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 37,

further comprising, after said step of peeling off said support substrate at said second ion implanted peeling layer as an interface and before said step of separation to an individual solid-state image pickup device, the steps of removing said second single crystalline semiconductor layer to expose said insulating layer,

forming an on-chip color filter including a pigment on said exposed insulating layer, and forming an on-chip microlens on said on-chip color filter and

further comprising, before or after said step of separation into an individual solid-state image pickup device, the step of affixing a transparent substrate on said solid-state image pickup sensor unit with a predetermined air gap determined by a diameter of a spacer in a sealing agent from said on-chip microlens side.

49. (Withdrawn) A method of production of an ultra-thin semiconductor device comprising the steps of:

forming a single crystalline semiconductor layer on a seed substrate via an ion implanted first ion implanted peeling layer;

bonding said seed substrate to a support substrate having a porous semiconductor peeling layer formed thereon from said single crystalline semiconductor layer side via an insulating layer;

separating said seed substrate using said ion implanted peeling layer as an interface; and

separating said support substrate using said porous semiconductor peeling layer as an interface to obtain said single crystalline semiconductor layer formed on said insulating layer.

50. (Withdrawn) A method of production of an ultra-thin semiconductor device comprising the steps of:

forming a base comprised of a support substrate on which a porous semiconductor peeling layer, a second single crystalline semiconductor layer, an insulating layer, and a first single crystalline semiconductor layer are stacked and forming a semiconductor device unit and projecting connection electrodes to be

connected to the semiconductor device unit at said first single crystalline semiconductor layer;

forming a score along a separation line for separation to an individual semiconductor device from said first single crystalline semiconductor layer side until at least said porous semiconductor peeling layer of said base is reached;

forming a resin protective film filling an interior of said score and covering the surface of said first single crystalline semiconductor layer;

exposing said projecting connection electrodes at the surface by polishing one surface of said resin protective film;

covering said resin protective film surface and said projecting connection electrode surfaces by a conductive protective tape free from residual;

peeling off said support substrate using said porous semiconductor peeling layer as an interface; and

dicing from said second crystalline semiconductor layer side along said resin protective film filled in said score to separate an individual semiconductor device.

51. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 50, further comprising, in said step of peeling off said support substrate at said porous semiconductor peeling layer, spraying a fluid from a lateral direction to said porous semiconductor peeling layer while rotating to peel off said support substrate.

52. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 50, further comprising, in said step of peeling off said support substrate at said porous semiconductor peeling layer, emitting a laser beam

from a lateral direction to said porous semiconductor peeling layer while rotating to peel off said support substrate.

53. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 50, wherein said step of forming a base comprises the steps of:

implanting ions into a seed substrate to form an ion implanted peeling layer at a depth from the surface of said seed substrate corresponding to a thickness of said first single crystalline semiconductor layer;

forming said porous semiconductor peeling layer at said support substrate;

forming said second single crystalline semiconductor layer on said porous semiconductor peeling layer;

forming said insulating layer on said second single crystalline semiconductor layer;

bonding said seed substrate and said support substrate from said first single crystalline semiconductor layer and said insulating layer sides;

peeling off said seed substrate at said ion implanted peeling layer as an interface to form a first single crystalline semiconductor layer; and

etching the surface of said first single crystalline semiconductor layer by hydrogen annealing.

54. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 53, further comprising, in said step of peeling off said seed substrate at said ion implanted peeling layer as an interface to form said first single crystalline semiconductor layer, emitting a laser beam from a lateral direction to said ion implanted peeling layer while rotating to peel off said seed substrate.

55. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 53, further comprising, in the step of forming said insulating layer, forming said insulating layer including at least one type of film among a silicon oxide film, a silicon nitride film, a multilayer film of a silicon oxide film and silicon nitride film, a multilayer film of a silicon oxide film, a silicon nitride film, and a silicon oxide film, a silicon oxynitride film, and an aluminum oxide film.

56. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 53, further comprising, in said step of peeling off said seed substrate at said ion implanted peeling layer as an interface, performing heat treatment to cause strain in said ion implanted peeling layer, then pulling in a direction separating said seed substrate and said support substrate to peel off said seed substrate.

57. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 53, further comprising, in said step of forming said porous semiconductor peeling layer, forming an impurity-doped layer comprised of a single crystalline semiconductor layer containing an impurity and converting it to a porous semiconductor by anodic conversion.

58. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 53, further comprising, in said step of forming said porous semiconductor peeling layer, forming said porous semiconductor peeling layer by a porosity so as to enable peeling at said ion implanted peeling layer as an interface compared with said porous semiconductor peeling layer when peeling off said seed substrate.

59. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 53, further comprising, in said step of forming said

porous semiconductor peeling layer, forming it by at least two layers of different porosities.

60. (Withdrawn) A method of production of an ultra-thin semiconductor device as set forth in claim 50, further comprising, in the step of separation to an individual semiconductor device, dicing by a width narrower than a width of said score and at the substantial center of said score so that part of said resin protective film covers the side surfaces of said first single crystalline semiconductor layer, said insulating layer, and said second single crystalline semiconductor layer separated by the dicing.

61. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device comprising the steps of:

forming a base comprised of a support substrate on which a porous semiconductor peeling layer, a second single crystalline semiconductor layer, an insulating layer, and a first single crystalline semiconductor layer are stacked and forming a solid-state image pickup sensor unit and projecting connection electrodes to be connected to the solid-state image pickup sensor unit at said first single crystalline semiconductor layer;

forming a score along a separation line for separation to an individual solid-state image pickup device from said first single crystalline semiconductor layer side until at least said porous semiconductor peeling layer of said base is reached;

forming a resin protective film filling an interior of said score and covering the surface of said first single crystalline semiconductor layer;

exposing said projecting connection electrodes at the surface by polishing one surface of said resin protective film;

covering said resin protective film surface and said projecting connection electrode surfaces by a conductive protective tape free from residual;

peeling off said support substrate using said porous semiconductor peeling layer as an interface; and

dicing from said second crystalline semiconductor layer side along said resin protective film filled in said score to separate an individual solid-state image pickup device.

62. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 61, further comprising, in said step of peeling off said support substrate at said porous semiconductor peeling layer as an interface, spraying a fluid from a lateral direction to said porous semiconductor peeling layer while rotating to peel off said support substrate.

63. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 61, further comprising, in said step of peeling off said support substrate at said porous semiconductor peeling layer as an interface, emitting a laser beam from a lateral direction to said porous semiconductor peeling layer while rotating to peel off said support substrate.

64. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 61, wherein said step of forming a base comprises the steps of:

implanting ions into a seed substrate to form an ion implanted peeling layer at a depth from the surface of said seed substrate corresponding to a thickness of said first single crystalline semiconductor layer;

forming said porous semiconductor peeling layer at said support substrate;

forming said second single crystalline semiconductor layer on said porous semiconductor peeling layer;

forming said insulating layer on said second single crystalline semiconductor layer;

bonding said seed substrate and said support substrate from said first single crystalline semiconductor layer and said insulating layer sides;

peeling off said seed substrate at said ion implanted peeling layer as an interface to form a first single crystalline semiconductor layer; and

etching the surface of said first single crystalline semiconductor layer by hydrogen annealing.

65. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 64, further comprising, in said step of peeling off said seed substrate at said ion implanted peeling layer as an interface to form said first single crystalline semiconductor layer, emitting a laser beam from a lateral direction to said ion implanted peeling layer while rotating to peel off said seed substrate.

66. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 64, further comprising, in the step of forming said insulating layer, forming said insulating layer including at least one type of film among a silicon oxide film, a silicon nitride film, a multilayer film of a silicon oxide film and silicon nitride film, a multilayer film of a silicon oxide film, a silicon nitride film, and a silicon oxide film, a silicon oxynitride film, and an aluminum oxide film.

67. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 64, further comprising, in said step of peeling off said seed substrate at said ion implanted peeling layer as an interface, performing heat treatment to cause strain in said ion implanted peeling layer, then pulling in a direction separating said seed substrate and said support substrate to peel off said seed substrate.

68. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 64, further comprising, in said step of forming said porous semiconductor peeling layer, forming an impurity-doped layer comprised of a single crystalline semiconductor layer containing an impurity and converting this to a porous semiconductor by anodic conversion.

69. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 64, further comprising, in said step of forming a porous semiconductor peeling layer, forming said porous semiconductor peeling layer by a porosity to enable peeling at said ion implanted peeling layer as an interface compared with said porous semiconductor peeling layer when peeling off said seed substrate.

70. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 64, further comprising, in the steps of forming said porous semiconductor peeling layer, forming the layer by at least two layers of different porosities.

71. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 61, further comprising, in the step of separation to an individual solid-state image pickup device,

dicing by a width narrower than a width of said score and at the substantial center of said score so that part of said resin protective film covers the side surfaces of said first single crystalline semiconductor layer, said insulating layer, and said second single crystalline semiconductor layer separated by the dicing.

72. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 61, further comprising, after the step of separation to an individual solid-state image pickup device, the steps of:

removing said second single crystalline semiconductor layer to form said resin protective layer projecting up from the surface of said insulating layer by exactly an amount corresponding to the thickness of said second single crystalline semiconductor layer and covering the side surfaces of said solid-state image pickup device and

affixing a transparent substrate to said solid-state image pickup device from said insulating layer side using the amount of projection of said resin protective layer as an air gap.

73. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 61,

further comprising, after the step of peeling off said support substrate at said porous semiconductor peeling layer as an interface and before the step of separation to an individual solid-state image pickup device, a step of affixing a color filter substrate from said insulating film side of said solid-state image pickup device and

further comprising, in said step of separation to an individual solid-state image pickup device, dicing from said color filter substrate side along said resin

protective film filling said score to separate said individual solid-state image pickup device.

74. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 73,

further comprising, in said step of forming a resin protective film, forming a transparent resin protective film and

further comprising, in said step of affixing said color filter substrate, positioning by monitoring an alignment mark of said first single crystalline semiconductor layer through said resin protective film and an alignment mark of said color filter substrate, then affixing said color filter substrate.

75. (Withdrawn) A method of production of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 61,

further comprising, after said step of peeling off said support substrate at said porous semiconductor peeling layer as an interface and before said step of separation to an individual solid-state image pickup device, the steps of removing said second single crystalline semiconductor layer to expose said insulating layer, forming an on-chip color filter including a pigment on said exposed insulating layer, and forming an on-chip microlens on said on-chip color filter and

further comprising, before or after said step of separation into an individual solid-state image pickup device, the step of affixing a transparent substrate on said solid-state image pickup sensor unit with a predetermined air gap determined by a diameter of a spacer in a sealing agent from said on-chip microlens side.

76. (Withdrawn) A production apparatus of an ultra-thin semiconductor device discharging a fluid to a substrate having at least two porous semiconductor

peeling layers inside it to separate said substrate at a predetermined porous semiconductor peeling layer, comprising:

support portions for rotatably supporting front and back of said substrate;

a discharge portion for discharging said fluid toward said predetermined porous semiconductor peeling layer; and

a stopper portion for preventing the fluid from said discharging portion from striking other porous semiconductor peeling layers.

77. (Withdrawn) A production apparatus of an ultra-thin semiconductor device as set forth in claim 76, wherein said discharging portion discharges said fluid containing solid fine particles.

78. (Withdrawn) A production apparatus of an ultra-thin semiconductor device as set forth in claim 76, wherein said discharging portion discharges said fluid subjected to ultrasonic waves.

79. (Withdrawn) A production apparatus of an ultra-thin back-illuminated solid-state image pickup device discharging a fluid to a substrate having at least two porous semiconductor peeling layers inside it to separate said substrate at a predetermined porous semiconductor peeling layer, comprising:

support portions for rotatably supporting front and back of said substrate;

a discharge portion for discharging said fluid toward said predetermined porous semiconductor peeling layer; and

a stopper portion for preventing the fluid from said discharging portion from striking other porous semiconductor peeling layers.

80. (Withdrawn) A production apparatus of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 79, wherein said discharging portion discharges said fluid containing solid fine particles.

81. (Withdrawn) A production apparatus of an ultra-thin back-illuminated solid-state image pickup device as set forth in claim 79, wherein said discharging portion discharges said fluid subjected to ultrasonic waves.

82. (Withdrawn) A production apparatus of an ultra-thin semiconductor device separating a substrate having at least two porous semiconductor peeling layers or ion implanted peeling layers obtained by ion implantation inside it using a predetermined porous semiconductor peeling layer or ion implanted peeling layer as an interface, comprising:

support portions for rotatably supporting front and back of said substrate and

a laser output portion for emitting a laser beam toward said predetermined porous semiconductor peeling layer or ion implanted peeling layer.

83. (Withdrawn) A production apparatus of an ultra-thin back-illuminated solid-state image pickup device separating a substrate having at least two porous semiconductor peeling layers or ion implanted peeling layers obtained by ion implantation inside it using a predetermined porous semiconductor peeling layer or ion implanted peeling layer as an interface, comprising:

support portions for rotatably supporting front and back of said substrate and

a laser output portion for emitting a laser beam toward said predetermined porous semiconductor peeling layer or ion implanted peeling layer.

84. (Previously Presented) A method of production of an ultra-thin semiconductor device comprising the steps of:

forming a first single crystalline semiconductor layer on a seed substrate via a first porous semiconductor peeling layer;

bonding said seed substrate from said first single crystalline semiconductor layer side in the state with an insulating layer interposed to a support substrate having a second single crystalline semiconductor layer formed thereon via a second porous semiconductor peeling layer wherein the first porous semiconductor peeling layer has a greater thickness than the second porous semiconductor peeling layer;

separating said seed substrate using said first porous semiconductor peeling layer as an interface; and

separating said support substrate using said second porous semiconductor peeling layer as an interface to obtain said first single crystalline semiconductor layer formed on said insulating layer.